

**MORLEY RESEARCH CENTRE****Effect of silver Y moth (*Autographa gamma*) infestation on sugar beet yield, 1996***E S Powell***Summary**

Three different pyrethroid insecticides were applied at two timings to plots of sugar beet and the crop was monitored for damage from the silver Y moth (*Autographa gamma*). While initial damage was moderately high, young leaves showed over 10% damage at the time of the first treatments, subsequent infestation was low and the crop rapidly grew away from the damage. There were few significant effects from the insecticide treatments.

**Object**

To determine the effect of different pyrethroid insecticides and their date of application on a population of silver Y moth (*Autographa gamma*).

**Method**

Three insecticides were applied at two of three timings to determine their effect on a population of silver Y moth and the damage it caused to a crop of sugar beet. The trial was imposed on a crop of sugar beet (var. Saxon) at Morley Research Centre, Norfolk. A factorial design was used with four replicates. The crop was drilled on 31 March 1996 following winter beans and received normal farm inputs. Treatments were applied using a 'Cornelius' backpack sprayer and 2 m boom at 200 l/ha spray volume. Further details on plot layout and experiment method, which were carried out to Morley standard operating procedures can be found in the Appendix.

Details of active ingredients are listed in Table 2 and treatment and assessment dates and crop growth stage are shown in Table 3.

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\*Not for publication without the Director's consent. This report deals primarily with only one year's work, so any conclusions given are provisional.

Table 1. *Insecticide treatments*

Treatments
Untreated
300 ml/ha Decis
250 ml/ha Ambush
150 ml/ha Hallmark

Table 2. *Application dates*

Target application dates
T1. 18 July 1996
T2. 30 July
T3. Ten days after T2 (not applied)

Table 3. *Active ingredients of herbicides*

Product	Active ingredients (g ai/l)
Ambush C	cypermethrin (100)
Decis	deltamethrin (25)
Hallmark	lambda cyhalothrin (50)

## Results

Only the first two applications of insecticide were applied on 18 and 30 July 1996. The third application was not applied as the expected second generation of silver Y moth did not materialise in sugar beet crops.

### Silver Y moth larvae, pupae and egg populations

An assessment of silver Y moth larvae, pupae and egg populations was made on each spray date and 2 or 4 days after treatment on untreated and previously treated plots. The infestation was very low and there were no significant differences between insecticides or application timings for eggs, pupae or larvae at any assessment. The numbers of eggs, larvae and pupae found on untreated plants on 17 July, the time of the first treatment application, averaged 0.2, 0.1 and 0.4 per plant respectively. On the 1 August the numbers had dropped to nil, nil and 0.2 per plant.

### Leaf damage

An assessment of % leaf damage of the crop was also made on the same assessment dates. Six leaves, counting from the heart of the plant outwards, were assessed on 5 plants per plot.

Leaf damage tended to be low on these leaves compared to the larger, older leaves on individual plants. There were no significant differences in leaf damage apart from on leaf 4 on 22 July and 1 August 1996 when there were some small but significant differences between treatments. The young leaves of untreated plants averaged 10% leaf damage on 18 July but this dropped to 3.9% on 22 July and 1.2% on 1 August as new leaves emerged.

### **Discussion**

The trial was set up following an epidemic of silver Y moth in the UK in July 1996, which caused substantial damage to sugar beet crops. The trial aimed to determine the effect of three pyrethroid insecticides and the date of application on silver Y moth populations. The insecticides were only applied at two instead of the planned three application dates. This was because the anticipated second generation of larvae did not develop. This may have been due to various factors such as a different host preference later in the year or an unforeseen decline in the adult population from insecticide use elsewhere.

Populations of silver Y moth eggs, pupae and larvae were very low, and no significant differences were found at any assessment. Differences may have been more apparent if populations had been assessed and treatments applied earlier in the season when damage to the crop was first observed, when populations would have been at their highest. It was also disappointing that the second generation did not develop.

Leaf damage was assessed on the first six leaves from the heart of the sugar beet plants outwards. Levels of damage were low on these leaves compared to the outer leaves of the plants where damage levels were much higher and there were only a few small significant differences between treatments on leaf 4. Also differences may have been more apparent if the leaves assessed at the later dates had included those of the same age as the leaves assessed initially.

### **Acknowledgements**

I would like to acknowledge the help of Morley staff who worked on the trial and the Morley Experiments Sub-committee who funded this work.

### **Appendix**

The following information is available on request:

- Field details
- Experiment method
- Experiment diary

**Field details**

<b>Site</b>	Morley Research Centre, Morley, Wymondham, Norfolk
<b>Field reference</b>	Hobarts Close [OS TG 067 003]
<b>Previous crop</b>	1995 winter beans 1994 winter barley
<b>Soil type</b>	Sandy loam
<b>Cultivations</b>	1 December 1995 ploughed 25 cm deep 31 March 1996 seedbed prepared
<b>Date sown</b>	31 March 1996
<b>Variety</b>	Saxon with Gaucho (imidacloprid, 70% w/w) treatment
<b>Seedrate</b>	17.5 cm seed spacing on 50 cm row width

**Nutrients applied prior to sowing**

15 October 1995      158 kg/ha potassium

**Applications to crop**

3 April 1996	40 kg/ha nitrogen as ammonium nitrate 26 kg/ha sulphur
29 April 1996	60 kg/ha nitrogen as ammonium nitrate
11 June 1996	1.4 kg/ha Mantec (manganese sulphate, 50% w/w)
17 July 1996	150 ml/ha Hallmark (lambda-cyhalothrin, 50 g/l)

## Experiment method

### Design

The trial was a factorial design replicated four times with plots 24 m long by 2 m wide.

### Application

Treatments were applied using a CO<sub>2</sub> powered 'Cornelius' knapsack sprayer and 2 m boom (four nozzles at 0.5 m spacings) with Lurmark F110-03 flat fan nozzles at 2 bar pressure to give 200 l/ha spray volume at 1.6 m/s forward speed.

Water used in the trial was pH 7.8.

### Assessments

Weed and beet damage scores used a 0 to 10 linear scale where 0 = no damage and 10 = complete crop destruction.

Treatments were harvested by hand. Yields were assessed on 20 m lengths of the two centre rows of each plot. Topping was restricted to one operator per replicate.

Assessments of clean beet yields and sugar content were made in the Morley tare house. Beet were washed in a Cocksedge high water pressure continuous barrel washer and then sliced by a Cocksedge Mark 1 high speed saw machine. The brei produced was then analysed with a standardised Thorn EMI NPL automatic polarimeter type 243 to determine sugar content. Two 26 g samples of brei were each digested with 177 ml of basic lead acetate for a minimum of four and a maximum of ten minutes, and then filtered. The filtrate was passed through the polarimeter and sugar content recorded. A variation of more than 0.2 % sugar necessitated a repeat of the two samples. Four 26 g samples were stored in a domestic freezer (-18°C) for future reference.

### Weather

Weather data were obtained from a "Hardi Metpole". Recordings were taken every ten minutes and summarised every thirty minutes. These are not presented in the report but are available on request to the author(s).

### Overall treatments

Overall treatments were applied using 24 m tramlines across the rows of the beet. These were situated at plot ends.

## Experiment diary

**31 March 1996 - trial drilled**

**18 July 1996 - T1 treatments applied, silver Y moth larvae, pupae and egg population counts and % leaf damage assessments**

**Weather** 0/8 cloud, 23°C, calm, relative humidity 69%  
**Soil** dry, medium tilth  
**Crop** 100% crop cover

**22 July 1996 - silver Y moth larvae, pupae and egg population counts and % leaf damage assessments**

**Crop** 100% crop cover

**30 July 1996 - T2 treatments applied, silver Y moth larvae, pupae and egg population counts and % leaf damage assessments**

**Weather** 8/8 cloud, 22°C, wind NW 2-3 m/s, relative humidity 61%  
**Soil** moist, medium tilth  
**Crop** 100% crop cover

**1 August 1996 - silver Y moth larvae, pupae and egg population counts and % leaf damage assessments**

**Crop** 100% crop cover

**26 November 1996 - trial harvested**

**Crop** mature